

Rittenhouse Street, N.W. Traffic Calming Study

Prepared for:

**District Department of Transportation
Transportation Policy and Planning Administration**

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Rittenhouse Street, N.W.

I. Introduction

The primary ‘impact’ or study area for the Rittenhouse Traffic Calming Study is between Utah Avenue and Western Avenue. However, while focusing on this discrete study area DDOT also analyzed traffic impacts within a four-block radius. Based on this comprehensive analysis, DDOT recommends traffic calming measures 3100, 3200, 3300, 3400, 3500 and 3600 blocks of Rittenhouse Street, NW. Along this corridor there are 91 households and 28 driveways, with parking allowed on both sides of the street. Each block along this portion of Rittenhouse Street has a width of 30 feet from curb to curb. This entire portion of Rittenhouse Street is classified as a local street¹ in a residential area, and the existing major traffic problems mainly come from the cut-through traffic².

The overall goal of traffic calming is to “maintain the livability and environmental quality of the neighborhoods while ensuring the safe, efficient and economical movement of persons and goods”³. In practice, traffic calming measures (such as speed humps) can be utilized to reduce vehicular speed and volume in order to provide safe neighborhoods for motorists, bicyclists, pedestrians and residents while maintaining access and services to the neighborhood.

II. Study Findings

1. Study Area Description

Western Avenue is the boundary between Washington DC and The State of Maryland through upper northwest Washington, DC. Western Avenue and Utah Avenue serve as west and east boundaries of the study area, while Stephenson Place and Quesada Street serve as north and south boundaries. The Board of Zoning classifies the study area as R-1B Residential. Three roadways, Nevada Avenue (Collector), Broad Branch Road (Local) and Utah Avenue (Collector), are almost parallels going through the area from southeast to northwest and join Western Avenue. The Average Daily Traffic (ADT) on Broad Branch, Utah, and Western falls between 3,000 and 6,000 cars per day. Based on PSI traffic counts, the ADT on Rittenhouse Street, N.W. is about 2,100 per day.

¹ The roadways in Washington DC are classified in the following categories: interstate, other freeways & expressways, principles, minors, collectors, and local streets.

² Cut-through traffic - through traffic diverted from arterial and collector streets onto local residential streets to avoid congestion.

³ D.C. Traffic Calming Policies and Guidelines, 2002

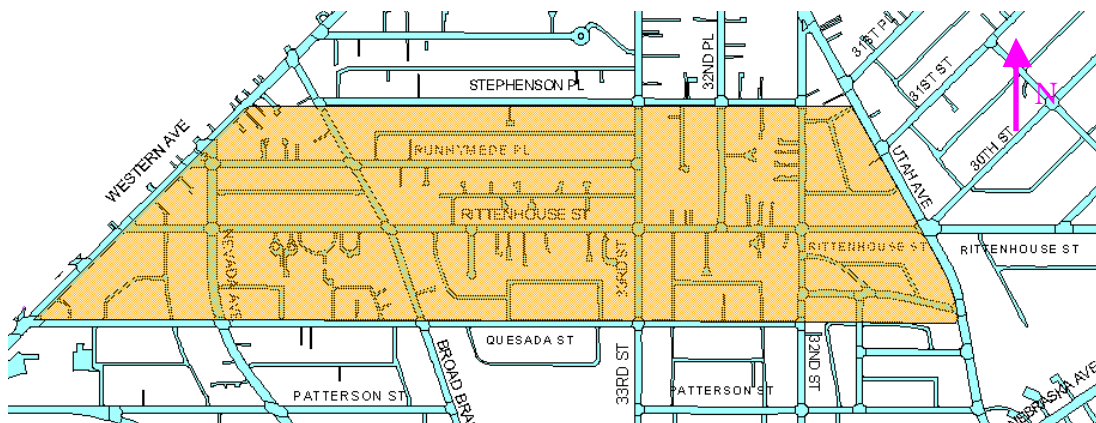


Figure 1 Map of study area

2. Traffic Conditions

The speed limit on all the local streets in this area is 25 mph. Parking is allowed on both sides of Rittenhouse Street, N.W., with about 40% of the parking spaces used during daytime. Little or no bicycle traffic can be observed on the study street. Pedestrian traffic is also light. Trucks over 1¼ tons are not allowed to use the study street. This portion of Rittenhouse Street, N.W. is not a snow route, bus route or an emergency route for fire, police stations, and hospitals.

There are three schools in the general vicinity of the study area: Blessed Sacrament Elementary School, Lafayette Elementary School and Episcopal Center for Children. Blessed Sacrament Elementary School is located at Chevy Chase Pkwy close to Chevy Chase Circle, and it has a present enrollment of 495 students. Lafayette Elementary School is located at Broad Branch Road N.W. south of Quesada Street and has a present enrollment of 468 students. The Episcopal Center for Children is located right at the northeast corner of Utah Avenue and Nebraska Avenue intersection. It primarily serves students with disabilities and has an enrollment of 59 students.

3. Geometric and Roadway Conditions

Along Rittenhouse Street, the intersection with 33rd Street N.W. has the highest altitude. The grade varies from west to east. It is about 3% downgrade from Western Avenue to Nevada Avenue, about 2% upgrade to Broad Branch Road, about 4% upgrade to 33rd Street, about 4.6% downgrade to 32nd Street and about 2% downgrade to Utah Avenue.

The roadway surface is in fair condition with several existing potholes. The roadway is well aligned, with no double yellow line in the middle.

4. Traffic Accident Analysis

According to the traffic accident reports supplied by the Traffic Accident Reporting and Analysis System (TARAS) of DDOT, there were 6 traffic accidents on Rittenhouse Street N.W. from 2000 – 2002. Table 1 shows some of the detailed information for the accidents. Among these 6 accidents, 5 were “right-angle” type and 1 was “side-swiped” type. No pedestrian was involved.

Table 1 – Accident records during the most recent three years 2000 – 2002

Case NO.	1	2	3	4	5	6
Accident Occurred on	NEVADA AVE	RITTENHOUSE ST	NEVADA AVE	RITTENHOUSE ST	UTAH AVE	UTAH AVE
Enter object name	RITTENHOUSE ST	NEVADA AVE	RITTENHOUSE ST	THIRTY THIRD ST	RITTENHOUSE ST	RITTENHOUSE ST
Enter feet from object	0	0	0	50	0	0
Enter direction from object	Unknown	Unknown	Unknown	W	Unknown	Unknown
Address Block				3200		6100
Date of Accident	01/17/02	10/14/00	06/16/01	09/23/02	03/29/00	11/08/01
Time	840	815	1700	815	1030	800
Type of Accident	Injury	Prop. Damage, Injury	Prop. Damage	Prop. Damage	Injury	Prop. Damage
No. of vehicles involved	2	2	2	2	2	2
No. of injured persons	2	2	0	0	1	0
Type of Collision	Right Angle	Right Angle	Right Angle	Side Swiped	Right Angle	Right Angle
Road Type	Straight	Level	Level	Grade	Straight	Straight
Road Condition	Dry	Dry	Wet	Wet	Dry	Dry
Vehicle Type1	Passenger Auto	Police Scout Car-One Man	Passenger Auto	Passenger Auto	Passenger Auto	Passenger Auto
Vehicle Type2	Passenger Auto	Passenger Auto	Truck/Trailer	Truck/Trailer	Truck/Trailer	Truck/Trailer
Driver Action1	Going Straight	Going Straight	Going Straight	Going Straight	Going Straight	Going Straight
Driver Action2	Going Straight	Going Straight	Going Straight	Stop/Stand Traffic Lane	Going Straight	Going Straight
Contributing Circum.1	Auto Right of Way	Other	Auto Right of Way	Improper Passing	Driver Inattention	Stop Sign
Contributing Circum. 2	No Violation	No Violation	Other		No Violation	No Violation

According to the DDOT Traffic Calming Policies and Guidelines (2002): *accidents rates should be considered significant when there are 3 or more reported cases involving pedestrian, bicycle and automobiles along a local residential street within a one year period.* On Rittenhouse Street between Western Avenue and Utah Avenue, there are 2 reported accidents for each year during 2000 to 2002. Therefore, the accident rates should not be considered significant.

It should be noted that there were 3 right angle accidents at the intersection of Rittenhouse Street and Nevada Avenue, with 1 accident in each year during 2000 to 2002. All Way Stop signs control the intersection. DDOT analysis reveals that the “contributing circumstance” for two of these three accidents was a “FAILURE TO YIELD RIGHT OF WAY” by at least one of the motorists.

5. Traffic volume and speed

In an effort to provide a comprehensive analysis for the entire neighborhood, speed readings and 24-hour traffic counts were taken on Rittenhouse Street, N.W. as well as the and surrounding streets (see Table 2 and Table 3a-3e).

According to DDOT Traffic Calming Policies And Guidelines (2002), traffic calming measures ***should*** be considered if the following criteria is met: (1) the average daily traffic (ADT) exceeds 1,500 vehicles per day or if the peak hour volume is greater than 150 vehicles for the roadway; or (2) the 85th percentile speed⁴ on a street segment exceeds the posted speed limit by at least 10 mph. Based on the traffic counts conducted during May 2003, the ADT on Rittenhouse is about 2,100 per day. Based on the vehicular speed collected by speed radar in May and again in June 2003, the 85th percentile speed on Rittenhouse Street is between 25 and 32 mph. Although the 85th percentile speed does not exceed the posted speed limit of 25 mph by 10 mph, the ADT exceeds 1,500 vehicles per day. Therefore, the traffic calming measures are justified along this corridor.

6. *Intersection Level of Service (LOS)*⁵

Computerized programs of SYNCHRO & SimTraffic have been utilized to analyze and simulate traffic conditions. The results indicate that the intersections of Rittenhouse Street with Nevada Avenue and Broad Branch Road have a Level of Service (LOS) of A, which means the average traffic control delay per vehicle is below 10 seconds.

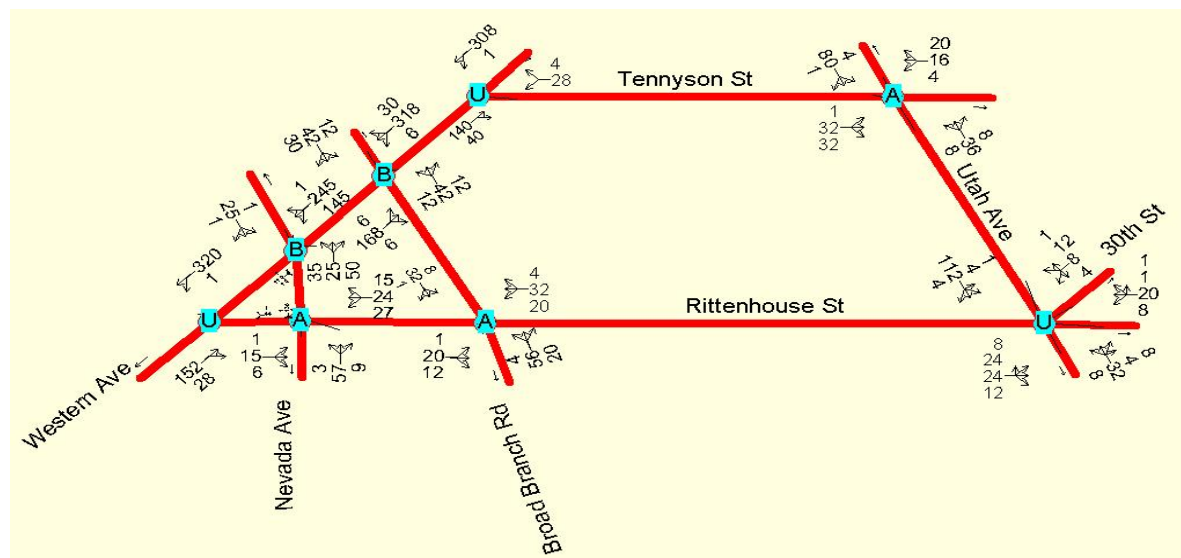


Figure 2 Traffic turning movements and Intersection of Level of Service (AM)

⁴ 85th percentile speed – the speed at or below which 85% of the vehicles are moving.

⁵ Control Delay Per Vehicle (s) classifies the Level of Service (LOS) for the intersection.

LOS A (<=10 sec), LOS B (>10 and <=20), LOS C (>20 and <=35), LOS D (>35 and <=55), LOS E (>55 and <=80), and LOS F (>80).

7. Analysis of Existing Traffic Conditions

a. Cut-through traffic

Rittenhouse Street, N.W. is a local street north of Chevy Chase Circle that connects Western Avenue to Nevada Avenue, Broad Branch Road and Utah Avenue. Therefore, some drivers use this residential street as a ‘cut-through’ street to travel between the aforementioned collector streets. Specifically, during AM and PM peak hours, motorists cut through Rittenhouse Street to avoid heavy traffic on the collector streets.

b. Intersection of Rittenhouse Street, N.W. and Western Avenue, N.W.

The approach from Rittenhouse Street is controlled by a stop sign. The intersection of Rittenhouse Street and Western Avenue forms a fairly sharp angle of about 45 degrees. Some parked vehicles were observed on the east side of Western Avenue within 30 feet of the intersection (Figure 3, Appendix). Parked cars also block drivers views from Rittenhouse Street to Western Avenue. In addition, the traffic on Western Avenue at the intersection is free flowing, increased safety concerns especially left turns, for traffic turning from Rittenhouse Street onto Western Avenue. Parking restrictions within 40 feet of the intersection should alleviate these ‘sight line’ problems.

c. Intersection of Rittenhouse Street, N.W. and Nevada Avenue, N.W.

This intersection is controlled by an all way stop. Nevada Avenue is a collector street that is designed to carry more traffic than Rittenhouse Street, N.W., a local street. Nevada Avenue and Rittenhouse Street are 40 and 30 feet, respectively. According to field observations during the AM peak hours, approximately 145 vehicles per hour turn left from Western Avenue onto southbound Nevada Avenue, and then across Rittenhouse Street.

At the southbound approach to the intersection of Nevada Avenue and Rittenhouse Street, the stop bar at the southbound approach has faded out (Figure 4, Appendix). Additionally, the southbound all way stop sign is located behind a leaning tree, that obstructs the view of the sign for drivers until they are very close to the intersection (Figure 5, Appendix). Although there is a ‘stop ahead sign’ before the all way stop sign, this may also become blocked by trees and/or parked vehicles (Figure 6, Appendix). All these circumstances may lead to running over the southbound stop control unintentionally without slowing down.

There were 3 right angle accidents at the intersection of Rittenhouse Street and Nevada Avenue, with 1 accident in each year during 2000 to 2002 (Data from TARAS).

III. Recommendations

The recommended traffic calming measures for Rittenhouse Street include speed humps, speed hump warning signs, a raised crosswalk, all-way stop controls, and turning restriction signs. According to *Traffic Calming – State of the Practice* edited by the Institute of Transportation Engineers; speed humps are effective in reducing both traffic speed and volume by up to 20% in the immediate area of the hump (see Table 4a and 4b). Installing raised crosswalks and turning restriction signs will also reduce traffic speed and volumes.

1. *Traffic calming measures*

a. **Speed humps and warning signs:**

Install two 12' wide 4" high speed humps: one in block 3300 and one in block 3500 of Rittenhouse Street, N.W.

b. **Raised crosswalk**

Install a raised crosswalk at the intersection of 32nd Street and Rittenhouse Street, N.W.

c. **No turn restriction signs:**

Install a NO RIGHT TURN (7:00-9:30 AM, Monday-Friday) sign on Western Avenue at Rittenhouse Street for the northbound traffic, and a NO LEFT TURN (7:00-9:30 AM, Monday-Friday) sign on Western Avenue at Rittenhouse Street for the southbound traffic. Install a NO LEFT TURN (4-6:30 PM Monday-Friday) sign on Utah Avenue at Rittenhouse Street for the northbound traffic.

DDOT anticipates these turning prohibitions will discourage cut-through traffic.

d. **Stripe edge lines around parking areas on Rittenhouse Street, N.W.**

Edge lines give the impression that the roadway is narrower and will cause most drivers to slow down. This should also reduce sideswiping of parked vehicles.

2. *Safety improvements*

a. **The intersection of Rittenhouse Street and Nevada Avenue:**

The intersection is all way stop controlled. However, at the southbound approach the stop bar has faded out and the sight view of the "STOP AHEAD" sign and "STOP" sign are blocked by trees and parked vehicles. DDOT will remark the faded stop bar and add an additional "STOP" sign facing north at the southeast corner of this intersection.

b. Parking restriction at the intersection of Western Avenue and Rittenhouse Street:

Rittenhouse Street N.W. intersects Western Avenue, N.W. with a degree of about 45°. This angle causes a visibility problem. In addition, vehicles parked less than 30 feet from the intersection were observed. These vehicles obstruct the visibility. Install “No Parking” signs on both Rittenhouse Street and Western Avenue 40 feet from the intersection.

c. All Way Stop control at the T-intersection of Rittenhouse Street and 32nd Place, N.W.

32nd Place is currently stop sign controlled at this intersection, not Rittenhouse Street. Except for 34th Place, that is a short cul de sac with few homes, Rittenhouse and 32nd Place is the only other intersection that is not all way stop controlled on Rittenhouse Street, N.W. between Western Avenue and Utah Avenue. Motorists on 32nd Street may fail to yield the right of the way under the impression that the T-intersection is all way stop controlled. Furthermore, the sight distance is restricted at the intersection by parked vehicles on both sides. Based on engineering judgment, an all way stop control and crosswalk at the T-intersection of 32nd Place and Rittenhouse Street, N.W. is recommended (refer to MUTCD Section 5B.02)

IV. Cost Estimate

Table 6. Quantities and cost estimates for traffic calming measures

Items	Quantities	Unit	Unit Price	Sub Total
12-foot speed humps	2	EACH	\$2,500 ⁶	\$5,000
HUMPS AHEAD Signs	2	EACH	\$87	\$174
Markings on humps	4	EACH	\$77	\$308
Raised crosswalk	1	EACH	\$2,500	\$2,500
Markings on raised crosswalk	1	EACH	\$150	\$150
NO RIGHT TURN Signs 7:00-9:30 AM	1	EACH	\$87	\$87
NO LEFT TURN Signs 4:00-6:30 PM	2	EACH	\$87	\$174
Stop Signs	3	EACH	\$87	\$261
Parking Restriction signs	4	EACH	\$87	\$348
Remark stop bar	15	FOOT	\$1	\$15
Crosswalk marking	120	FOOT	\$1	\$120
Stripe edge lines around parking areas	5000	FOOT	\$1	\$ 5,000
Total Cost				\$14,137

⁶ Based on DDOT 1999 estimates.

V. Appendix

1. Figures and Tables



Figure 3 Parked vehicles on Western Avenue close to the intersection with Rittenhouse Street may block the sight of view of the drivers



Figure 4 Faded stop bar at the southbound approach at the intersection of Nevada Avenue and Rittenhouse Street



Figure 5 The All Way Stop sign is located behind a leaning tree at the southbound approach at the intersection of Nevada Avenue and Rittenhouse Street



Figure 6 The Stop Ahead sign is located behind a tree at the southbound approach at the intersection of Nevada Avenue and Rittenhouse Street



Figure 6 Rittenhouse Street and 32nd Place

Table 2. Vehicle speed data collected by speed radars

Location		Date	Day	Time	Lowest Speed	Highest Speed	Average Speed	85th Percentile Speed	Vehicles Observed
Rittenhouse St 250' East of Nevada Ave, NW	Eastbound	6/3/2003	Tue	7- 8 am	18	30	24	28	18
	Westbound	6/3/2003	Tue	7- 8 am	19	41	28	32	68
	Eastbound	6/3/2003	Tue	10 -11am	15	35	26	30	33
	Westbound	6/3/2003	Tue	10 -11am	16	35	26	31	44
	Eastbound	6/3/2003	Tue	4 - 5 pm	15	36	24	29	62
	Westbound	6/3/2003	Tue	4 - 5 pm	19	36	26	29	35
Rittenhouse St 250' West of Utah Ave, NW	Eastbound	5/22/2003	Thurs	7- 8 am	17	31	23	25	67
	Westbound	5/22/2003	Thurs	7- 8 am	15	34	23	27	70
	Eastbound	5/22/2003	Thurs	10 -11am	20	37	25	27	34
	Westbound	5/22/2003	Thurs	10 -11am	17	31	25	27	32
	Eastbound	5/22/2003	Thurs	4 - 5 pm	18	31	24	26	55
	Westbound	5/22/2003	Thurs	4 - 5 pm	15	32	25	28	45

Table 3a. Hourly traffic volume data on Rittenhouse St. Between Western Ave. and Nevada Ave., NW

	Rittenhouse St. between Western Ave. and Nevada Ave, NW			
	Eastbound		Westbound	
	Weekday Average	Weekend Average	Weekday Average	Weekend Average
	5/15/03-5/16/03	5/17/03-5/18/03	5/15/03-5/16/03	5/17/03-5/18/03
5am	10	6	11	6
6am	28	7	22	14
7am	84	22	46	31
8am	114	46	71	49
9am	62	58	34	29
10am	43	86	24	40
11am	66	80	34	44
12noon	74	96	34	52
1pm	58	88	36	50
2pm	84	84	45	54
3pm	91	79	75	48
4pm	79	72	62	43
5pm	86	94	70	65
6pm	80	82	64	56
7pm	61	60	68	48
8pm	53	47	40	38

Table 3b. Hourly traffic volume data on Rittenhouse St. Between 32nd St. and Utah Ave., NW

	Rittenhouse St. between 32 nd St. and Utah Ave., NW			
	Eastbound		Westbound	
	Weekday Average	Weekend Average	Weekday Average	Weekend Average
	5/14/03-5/16/03	5/17/03-5/18/03	5/15/03-5/16/03	5/17/03-5/18/03
5am	9	5	16	1
6am	15	22	32	6
7am	76	59	86	33
8am	144	113	141	41
9am	100	68	78	48
10am	77	64	63	88
11am	83	88	68	88
12noon	105	96	78	102
1pm	83	102	69	114
2pm	107	95	90	119
3pm	120	123	128	108
4pm	122	123	112	103
5pm	128	129	138	88
6pm	132	141	118	89
7pm	109	102	89	69
8pm	67	69	54	55

Table 3c. Hourly traffic volume data on Western Ave. Between Tennyson St. and Stuyesant Pl., NW

	Western Ave. between Tennyson St. and Stuyesant Pl., NW	
	Southbound	Northbound
	Weekday Average	Weekday Average
	5/13/03-5/16/03	5/13/03-5/16/03
5am	35	12
6am	128	50
7am	414	134
8am	488	217
9am	324	157
10am	232	150
11am	240	207
12noon	268	238
1pm	217	208
2pm	246	232
3pm	260	349
4pm	239	388
5pm	229	420
6pm	279	407
7pm	228	242
8pm	122	178

Table 3d. Hourly traffic volume data on Utah Ave. Between 32nd St. and 31st St., NW

	Utah Ave. Between 32 nd St. and 31 st St., NW	
	Southbound	Northbound
	Weekday Average	Weekday Average
	5/13/03-5/16/03	5/13/03-5/16/03
5am	4	8
6am	10	45
7am	15	66
8am	30	51
9am	46	45
10am	52	39
11am	34	54
12noon	33	49
1pm	49	55
2pm	66	78
3pm	48	79
4pm	48	83
5pm	49	117
6pm	55	82
7pm	42	58
8pm	32	48

Table 3e. Hourly traffic volume data Quesada Street, NW

	Quesada Street, NW (One Way)	
	Eastbound	
Begin Time	Weekday Average	Weekend Average
	6/2/03-6/5/03	5/31/03-6/1/03
5am	4	3
6am	12	4
7am	53	32
8am	188	105
9am	28	45
10am	30	46
11am	31	75
12noon	36	59
1pm	34	52
2pm	30	56
3pm	97	70
4pm	46	55
5pm	37	58
6pm	45	76
7pm	38	35
8pm	33	24

Table 4a Speed Impacts Downstream of Traffic Calming Measures ⁷

Sample Measures	Average Speed After Calming (MPH)	Percentage Change
12-foot Speed Humps	27.4	-22%
22-foot tables	30.1	-18%
Turning Restriction	N/A	-12%
Circles	30.3	-11%
Narrowings	32.3	-4%
One-lane slow points	28.6	-14%
Half closures	26.3	-19%
Diagonal diverters	27.9	-4%

Table 4b Volume Impacts of Traffic Calming Measures

Sample Measures	Average Change In Volume (VPD)	Percentage Change
12-foot Speed Humps	-355	-18%
22-foot tables	-415	-12%
Turning Restriction	N/A	-61%
Circles	-293	-5%
Narrowing	-263	-10%
One-lane slow points	-392	-20%
Full closures	-647	-44%
Half closures	-1611	-42%
Diagonal diverters	-501	-35%
Other volume controls	-1167	-31%

VI. References

1. DDOT, *District of Columbia Traffic Calming Policies and Guidelines*, 2002
2. Ewing, Reid H., ITE and FHWA, US DOT, *Traffic Calming – State of the Practice*, 1999
3. Municipality of Anchorage Traffic Department, *Traffic Calming Protocol Manual*, March 2001

⁷ Sources: R. Ewing, *Traffic Calming – State of the Practice*, Institute of Transportation Engineers, Washington DC, 1999